

What is claimed:

1. DNA encoding a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence.
2. The DNA according to claim 1 wherein a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence is either of the following proteins (a) or (b):
  - (a) a protein comprising the sequence of amino acids shown in Seq. ID No: 2, or
  - (b) a protein comprising a sequence of amino acids wherein one or more of amino acids are deleted, substituted, or added in the sequence of amino acids shown in Seq. ID No: 2, and having reactivity against bacterial DNA having an unmethylated CpG sequence.
3. The DNA according to claim 1 comprising the sequence of bases shown in Seq. ID No: 1 or its complementary sequence, or part or whole of the sequences.
4. The DNA according to claim 1 which hybridizes with the DNA comprising a gene according to claim 3 under a stringent condition.
5. The DNA according to claim 1 wherein a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence is either of the following proteins (a) or (b):
  - (a) a protein comprising the sequence of amino acids shown in Seq. ID No: 4, or
  - (b) a protein comprising a sequence of amino acids wherein one or more of amino acid are deleted, substituted, or added in the sequence of amino acids shown in Seq. ID No: 4, and having reactivity against bacterial DNA having an unmethylated CpG sequence.
6. The DNA according to claim 1 comprising the sequence of bases shown in Seq. ID No: 3 or its complementary sequence, or part or whole of the sequences.
7. The DNA according to claim 1 which hybridizes with the DNA comprising the gene according to claim 6 under a stringent condition.
8. A receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence.
9. The protein according to claim 8 comprising the sequence of amino acids shown in Seq. ID No: 2.
10. The protein according to claim 8 comprising a sequence of amino acids wherein one or more of amino acids are deleted, substituted or added in the sequence of amino acids shown in Seq. ID No: 2.

11. The protein according to claim 8 comprising the sequence of amino acids shown in Seq. ID No: 4.

12. The protein according to claim 8 comprising a sequence of amino acids wherein one or more of amino acids are deleted, substituted or added in the sequence of amino acids shown in Seq. ID No: 4.

Sub A3  
13. A fusion protein comprising the protein according to any one of claims 8 to 12 fused with a marker protein and/or a peptide tag.

14. An antibody specifically bound to the protein according to any one of claims 8 to 12.

15. The antibody according to claim 14 which is a monoclonal antibody.

Sub A4  
16. A host cell comprising an expression system expressing the protein according to any one of claims 8 to 12.

17. A non-human animal wherein a gene encoding a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence is excessively expressed.

18. A non-human animal wherein a gene function encoding a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence is destroyed on a chromosome.

19. The non-human animal according to claim 18 having no reactivity against bacterial DNA having an unmethylated CpG sequence.

Sub A5  
20. The non-human animal according to any one of claims 17 to 19 characterized in that a rodent animal is a mouse.

21. A method of preparing a cell expressing a protein having reactivity against bacterial DNA having an unmethylated CpG sequence characterized in that the DNA according to any one of claims 1 to 7 is introduced into a cell wherein a gene function encoding a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence is destroyed on a chromosome.

22. A cell expressing a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence obtained by the method of preparing a cell expressing a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence according to claim 21.

23. A screening method for an agonist or an antagonist of a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence comprising steps of: in vitro culturing a cell expressing a receptor protein specifically recognizing bacterial DNA

having an unmethylated CpG sequence in the presence of a target substance, and measuring/evaluating TLR9 activity.

24. A screening method for an agonist or an antagonist of a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence comprising steps of: administering a target substance to a non-human animal wherein a gene function encoding a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence is destroyed on a chromosome, and measuring/evaluating TLR9 activity of macrophages or spleen cells obtained from the non-human animal.

25. A screening method for an agonist or an antagonist of a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence comprising steps of: administering a target substance to a non-human animal wherein a gene encoding a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence is excessively expressed, and measuring/evaluating TLR9 activity of macrophages or spleen cells obtained from the non-human animal.

26. A screening method for an agonist or an antagonist of a protein having reactivity against bacterial DNA having the unmethylated CpG sequence according to either of claims 24 or 25 using a mouse as a non-human animal.

27. An agonist or an antagonist of a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence obtained by the screening method for an agonist or an antagonist of a receptor protein specifically recognizing bacterial DNA having the unmethylated CpG sequence according to any one of claims 23 to 26.

28. A pharmaceutical composition comprising whole or part of a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence as an active component.

29. A pharmaceutical composition comprising the agonist or antagonist according to claim 27 as an active component.

30. A kit used to diagnose diseases related to the deletion, substitution and/or addition in a sequence of DNA encoding a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence comprising the DNA according to claim 3, which can compare a sequence of DNA encoding a receptor protein specifically recognizing bacterial DNA having an unmethylated CpG sequence in a test body with a sequence of bases in the DNA according to claim 3.